GUIDE TO REQUIREMENTS FOR REGULATED WATERWORKS SYSTEMS USING HIGH QUALITY GROUNDWATER

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Alberta Environment

DISCLAIMER

This guide provides a broad overview of Alberta Environment's requirements for a high quality groundwater waterworks system. It does not replace or affect the legislative requirements. The person responsible for a waterworks system must follow all of the legislated requirements. If there is any conflict between this document and the *Environmental Protection and Enhancement Act* (*EPEA*) or the *Water Act* and their regulations, *EPEA* or the *Water Act* and their regulations take precedence.

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INTRODUCTION

Waterworks systems using high quality groundwater must be registered with Alberta Environment and follow the *Code of Practice for Waterworks Systems using High Quality Groundwater*. This is a guide to registration and the *Code of Practice*.

WHAT IS HIGH QUALITY GROUNDWATER?

The definition of high quality groundwater includes the requirements that the groundwater is not under the direct influence of surface water and does not require treatment for health-related parameters. Generally this means that the water, in its natural untreated state, meets all chemical and radiological Maximum (and Interim Maximum) Acceptable Concentrations (MAC/IMAC) as specified in the Guidelines for Canadian Drinking Water Quality (GCDWQ), and for those parameters listed in the Compliance Monitoring section of the *Standards and Guidelines* document. One exception is for naturally occurring fluoride, which may be present up to a level of 2.4 mg/L.

WHICH WATERWORKS FACILITIES REQUIRE REGISTRATION?

A complete list of waterworks facilities requiring a registration can be found in Schedule 2, Division 5 of the *Activities Designation Regulation* of *EPEA*. **Registration does not apply** to systems that use a surface water source, groundwater under the direct influence of surface water (GWUDI), or groundwater that requires treatment for health-related parameters. These waterworks systems require approval under *EPEA*.

High Quality Ground Water Systems operating under an *EPEA* approval on October 1, 2003, are automatically registered. The system must continue to operate in accordance with the latest approval, until the Director notifies the registration holder in writing. The registration holder will, by a specified date, be required to operate in accordance with the requirements under the Code of Practice.

A registration is issued for activities specified in the application for registration or for the most recent application for an approval. Any change to an activity, or how it is carried out, requires notification in writing to the Director at Alberta Environment. For example, notification is required if iron and manganese reduction was not included in the original application. A significant change may result in the requirement for a new registration.

Requirements for extension or replacements of portions of the water distribution system are specified in the *Potable Water Regulation*. These projects do not require a new registration, however, the registration holder must provide notice to the Director prior to proceeding with construction. The Director's written authorization will be required if the design varies from the requirements of the *Standards and Guidelines* document. The Director may request detailed design information, hence it is advisable to allow sufficient time so any deficiencies can be addressed.

HOW TO REGISTER

Step 1:
Refer to the following web page for the registration process:
www.gov.ab.ca/env/protenf/approvals/factsheets/EPEA_RegistrationProcess.pdf

Step 2:
The general requirements for registering are specified in the *Approvals and Registrations Procedure Regulation*. The Code of Practice outlines additional information to be submitted specific to waterworks systems using high quality groundwater (Section 3.1.3). The application must contain all information necessary for the Director to make a decision.

Step 3:
Registration must be obtained before construction can begin. Applications will not be reviewed until they are complete. Due to the complexity of some applications, it is advisable to contact Department staff early in the process.

Step 4:
Send all registration applications to:

Alberta Environment
Regulatory Approvals Centre
Main Floor, Oxbridge Place
9820 – 106 Street
Edmonton, Alberta T5K 2J6
Phone: (780) 427-6311 (to connect toll-free first dial 310-0000)
Fax: (780) 422-0154

The Regulatory Approvals Centre will record receipt of the application and forward it to the appropriate Director in the region for which the project is being proposed.

Step 5:
Facilities that already hold a registration and require modifications shall inform the Director in writing of their intentions. Contact the Regulatory Approvals Centre for the Alberta Environment District Office nearest you.

WATERWORKS SYSTEM DESIGN REQUIREMENTS

The minimum design requirements for a waterworks system are set out in the *Potable Water Regulation*, and specified in detail in the *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems*. New systems must meet the design standards in existence at the date of registration. Any proposed deviations from the standards must be identified in the registration application, or authorized in writing by the Director.

Systems operating when new standards are published are not required to meet these new standards until the system is expanded or upgraded, or the Director gives written notice.

Domestic wastewater from water distribution systems such as sinks and washrooms must be disposed of into either a wastewater collection system that is approved or registered under *EPEA*, or a system permitted under the *Safety Codes Act*.

Any wastewater generated by water main disinfection must be disposed of into an approved wastewater collection system, or de-chlorinated before being discharged into a storm water drainage system.

Disposal of treatment process wastewater must be to a wastewater system approved or registered under *EPEA*, or a system permitted under the *Safety Codes Act* that is designed to accommodate the volume and type of wastewater generated. Any other disposal of process wastewater, such as direct release to the ground surface or a watercourse requires written authorization from the Director. The Director requires written justification and an assessment of the potential impacts, prior to authorizing such a release.

TYPES OF TREATMENT REQUIRED OR ALLOWED

Secondary disinfection only is required to maintain a chlorine residual throughout the distribution system. No further treatment is necessary as high quality groundwater sources already meet the health-related chemical and radiological concentration limits required.

Some water may exceed the Aesthetic Objectives (AO) specified in the *Guidelines for Canadian Drinking Water Quality (GCDWQ)*. Treatment to meet the AO's is at the discretion of the registration holder for the waterworks distribution system.

Typical types of treatment undertaken in high quality groundwater systems are iron and manganese reduction, fluoridation and softening. If iron and manganese reduction and/or fluoridation are proposed, the performance requirements specified in the Code of Practice must be met. Currently there are no specific performance requirements for water softening.

The addition of any chemicals is regulated in the *Potable Water Regulation* and the Code of Practice. Any treatment chemicals added to a waterworks system must meet the National Sanitation Foundation (NSF) Standard 60, or be authorized by the Director. The maximum dosage must not be exceeded. If the manufacturer specifies a lower dosage than NSF, then the manufacturer's maximum dosage must not be exceeded unless authorized by the Director.

If the chemical quality changes such that the water is no longer high quality (exceeds MAC for one or more constituents) then the Director must be notified and the need to replace the Code of Practice with an Approval will be reviewed.

SPECIFIC CODE OF PRACTICE REQUIREMENTS

Certified Operator

Certified operators are required to operate high quality groundwater waterworks systems. For more information on operator certification, please refer to *Water & Wastewater Operators' Certification Guidelines* published by Alberta Environment.

Depending on the system and population served, different distribution certification may be required:

- A Small Water Systems Certificate (includes treatment and distribution) is required for a water system serving less than 500 people.
- A Water Distribution Certificate is required for a water distribution system serving 500 or more people. The level is dependent on population served.

Water treatment classification is normally assessed based on a point system for a specific facility, in accordance with the *Water & Wastewater Operators' Certification Guidelines*, published by Alberta Environment. All high quality groundwater systems have been assessed a score of 30 points or less. Such a score requires a Level I Water Treatment (WT) Operator.

The Code of Practice sets out the number of operators required, as well as their minimum qualifications. The registration holder for a waterworks system with a single operator must arrange to provide backup operators.

Limits and Monitoring

The waterworks system must meet specified limits and be monitored routinely during its operation. Monitoring frequency varies from daily monitoring of the chlorine residual to complete annual analysis of the treated water. The primary monitoring requirements are set out in the Code of Practice; however the *Potable Water Regulation* also provides the Director with discretion to require additional monitoring.

Section 2.2.2 of the Code of Practice requires that analysis be conducted at an approved laboratory, unless otherwise specified in writing by the Director. Approved laboratories are laboratories that are accredited by the Standards Council of Canada to analyse for the parameters that must be monitored and reported under this code, except as indicated under Alberta Environment's *"Laboratory Data Quality Assurance Policy"*.

- Annual Monitoring
  The annual monitoring is intended to verify compliance and detect any trends, and to allow an appropriate proactive response to the trends. Samples submitted to an accredited laboratory must be analyzed for parameters as listed under Compliance Monitoring in the latest edition of the *Standards and Guidelines* Document.

- Trihalomethanes (THM's)
  Monitoring for trihalomethanes (THMs) is required in a multi-level scheme described below. Due to the seasonal variability of THMs, compliance with the limit is based on the rolling annual average of quarterly samples, taken at the same location.

  Initially, a comprehensive assessment is required to determine the status with respect to the THM limit. If the rolling annual average of quarterly samples exceeds the Maximum Allowable Concentration (MAC) in the GCDWQ, the facility may reduce the frequency of monitoring (based on population served) to the level specified in the Code of Practice, to verify that the limits are being met. If at any time the rolling annual average is exceeded, the facility must return to the most intensive monitoring requirement as stipulated in Sections 5.1.8 and 5.1.9 of the Code of Practice. A facility may only return to the less frequent verification monitoring level if none of the discrete quarterly samples, in a period of one year, exceed the MAC in the GCDWQ.

- Bacteriological Analysis
  Bacteriological analysis must be performed according to the GCDWQ for the population served, without any reduction in the number of samples or frequency of sampling. Collection of samples in excess of the minimum requirement is encouraged to demonstrate safe water and show diligence in meeting requirements.

  The *Potable Water Regulation* requires that these samples be taken at equal intervals throughout the monthly sampling period. Every effort must be made to evenly distribute the frequency of sampling, taking into account facility operating schedules and local health unit courier schedules. For example, a facility required to take eight samples a month should sample each Monday and on the last day of the week the provincial courier runs.

  It is important to have an alternate method (private courier, bus, personal delivery) of transporting samples directly to the Provincial Laboratories when the local health unit courier is not available. The Provincial Laboratories have routine pick-ups at bus depots and will send for a special pick-up when they are advised of a shipment. Drop boxes are also available outside the labs for after-hours deliveries.

- Chlorine Residual
  Chlorine residual, measured as free or total chlorine, must be monitored a minimum of five days per week. Alberta Environment recommends daily (seven days per week) or continuous monitoring. Total chlorine may exist as free chlorine, combined chlorine, or a combination of the two forms.

  Monitoring must be done at random sites throughout the distribution system and rotated so samples are taken from the entire distribution system over time as specified in Table 5-2 of the Code of Practice. This helps identify areas where chlorine residuals may be too low due to problems such as low flows, inadequate looping, excess disinfectant demand, etc. If areas of concern are identified, suitable corrective measures must be taken to avoid loss of chlorine in the distribution system.

  Continuous monitoring of chlorine residual entering the distribution system is recommended, as are automated alarms to notify the operator in case of low chlorine residual.

- Fluoridation
  Systems practising fluoridation must monitor weekly for fluoride in raw water, and must monitor daily (seven days per week) for fluoride in the treated water. The system must maintain a fluoride concentration of 0.8 mg/L, within the specified daily and monthly variations outlined in Table 5-1 of the Code of Practice. This value provides an optimum concentration for the promotion of good dental care. Although the GCDWQ currently specifies a range for the optimum concentration of (0.8 – 1.0 mg/L), the Department has adopted the lowest value in the range as the optimum concentration.

- Iron and Manganese Reduction
  Waterworks systems that use treatment to reduce iron and manganese must monitor weekly for iron and manganese in raw water, and a minimum of five days per week in the treated water. Daily or continuous monitoring is recommended. The treated water must meet the AO's for iron and manganese specified in the GCDWQ.

Reporting
If there is a contravention of any condition of the Code of Practice, regulations, or the *Water Act*, the registration holder is required to immediately report the contravention to the Director at (780) 422-4505. All reasonable corrective action must be taken to end the contravention, minimize the effects of the contravention, and prevent the contravention from recurring in the future.

Adverse bacteriological results may require reporting and follow up with the Health Authority and the Alberta Environment District Office under the *Communication and Action Protocol for Failed Bacteriological Results in Drinking Water for Waterworks Systems* regulated under the *Environmental Protection and Enhancement Act*.

Monthly reports are required to contain all of the monitoring information collected. These reports are to be compiled and retained according to the record keeping section of the Code of Practice. It is not necessary to submit these reports unless the Director has given notice that a monthly report is required. Electronic submission of results should be planned for.

Annual reports must be compiled and submitted to the Director by February 28 of the following calendar year. This report must contain the annual sample results, and a summary of all of the monthly reports, including the average, minimum and maximum values for each parameter monitored. The information provides a quick reference regarding the overall performance of the system.

Record Keeping
The registration holder must keep all information and documentation generated in designing, constructing, and operating a high quality groundwater waterworks system. Inspectors, investigators and the Director may request this information at any time.

Reclamation
Since Waterworks facilities tend to be designed, constructed and operated to have a very long lifespan, there is no requirement to have a reclamation plan included in the registration application. However, the Code of Practice requires that prior to decommissioning, a reclamation plan must be developed and authorized by the Director. If there are any items of concern in the plan, the Director can specify the requirements as conditions within the authorization issued for the reclamation.

Operations Program
Schedule 1 of the Code of Practice lists the minimum requirements for the Operations Program. This program should be considered as an "owner's manual." All routine and foreseeable operational events and actions must be included in the program. The program must be sufficiently comprehensive to allow a certified operator who is unfamiliar with the system to take over operation at any time.

Any comments, questions, or suggestions regarding the content of this document may be directed to:

Alberta Environment
Drinking Water Branch
8th Floor, Oxbridge Place
9820 – 106 Street
Edmonton, Alberta T5K 2J6
Phone: (780) 644-4959

Additional copies of this document may be obtained by contacting:

Alberta Environment
Education & Information Centre
Main Floor, Oxbridge Place
9820 – 106 Street
Edmonton, Alberta T5K 2J6
Phone: (780) 427-2700
Email: env.infocent@gov.ab.ca

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If you have any questions or would like more information, contact your local Alberta Environment office. For toll free access, dial 310-0000 from anywhere in Alberta.

APPENDIX

The following are some of the documents that impose or clarify requirements and obligations for protecting public health and the environment at this type of facility.

- *EPEA* *Part 2, Division 2 (Approvals, Registrations and Certificates)*
  Part 7 (Potable Water)
  Part 10 (Enforcement)
- *Activities Designation Regulation*, AR 211/96
- *Approvals and Registrations Procedure Regulation*, AR 113/93
- *Environmental Protection and Enhancement (Miscellaneous) Regulation*, AR 118/93
- *Potable Water Regulation*, AR 122/93
- *Water Act*
- *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems*, ("Standards and Guidelines document") published by Alberta Environment
- *Guidelines for Canadian Drinking Water Quality*, published by Health Canada ("GCDWQ")
- *Code of Practice for Waterworks Systems Using High Quality Groundwater*